INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

Powai, Mumbai 400076.

PR No. 1000048865 RFx NO. 6100002299

Item Description: Plasma Enhanced Chemical Vapour Deposition tool for Automated uniform Layer film Deposition – 1 No.

Sr.	Description	Technical Compliance YES/NO	Additional Information (If any)
1	Description :		
1.a	The Plasma Enhanced Chemical Vapor Deposition system should have the mentioned specifications for the deposition of SiO2 and SiN.		
2	Process:		
2.a	Aluminium Process Chamber. 400 (W) x 400 (D) x 175 (H), with chamber made from a single full block of Aluminium.		
2.b.	Pumping Flange and tee >=40 mm or better, for very high effective pumping speed.		
2.c.	Viewport with Righthand >=12mm flange with RF shield and side port at the Lefthand. There should be no further sealing or welds inside the process chamber.		
2.d	The system design of the plasma source and pumping must be radially symmetric (4) ports to ensure the best uniformity over a wide parameter range.		
3	System Console :		
3.a	The system should be fully interlocked to protect the system hardware from any service failure e.g. failed water supply for cooling purposes and to protect the operator from any electrical shock during maintenance procedures.		
3.b	System should be left in a safe state, under vacuum, in case of failure.		
4	Substrate Electrodes :		
4.a	The system should have a substrate electrode >=230 mm (8 inches).		
4.b	Maximum substrate size: up to 200 mm Whole wafers of 3'', 4'' and 6'' should be handled and transferred to the electrode with carriers.		

5	Lower Electrode :		
5.a	Electrodes should be designed for automated uniform layer thickness processing on up to 200 mm wafers for a future source upgrade path, and as such, should be at least 230 mm in diameter. The electrode should be of fixed height.		
5.b	Table should be electrically grounded.		
5.c	The system should have 2 Torr capacitance manometer and active penning gauge.		
5.d	The chamber liner should be lifted up/down after the robotic arm has loaded/unloaded the sample on the stage to eliminate unnecessary space in the liner.		
6	Temperature control:		
6.a	Upper electrodes made of Aluminum with heaters up to 200 0C The Lower electrode should be made of Stainless Steel and can be resistively heated up to at least 400 0C with stability of < ± 20C		
7	Plasma sources :		
7.a	Power supply for substrate electrode.		
7.b	13.56 MHz, 300 W Power, and directly coupled automatic tuning.		
7.c	It must be possible with the system to i.Work in automatic matching mode ii. Work in automatic matching mode with preset capacitor positions iii. Work with fixed capacitor positions iv) Aluminum dark space shield on ground potential		
8	LF Generator :		
8.a	A 300 W/400 KHz LF power supply for stress control in SiNx films must be provided.		
9	Vacuum system		
9.a	TMP 200 liters/sec and the Dry backing pump, 1500 liters/min (90m3/hr) or better with nitrogen purge standby.		
9.b	50 mm or better VAT high vacuum gate valve and automatic throttle valve. Smaller throttle valves are not acceptable.		
9.c	2 torr heated CM gauge, temperature compensated Penning gauge, and Electrical heating kit for internal pipe work up to 600C must be provided.		
10	Gas Manifold System :		
10.a	Gas Manifold for up to at least 6 MFC controlled gas lines fitted with 6 MFC's as 6 lines for 100% SiH4, NH3, N2O, N2, CF4, Ar		
10.b	Lines should be fitted with one electro-pneumatic isolation valve and in-line 0.5 um filter.		

10.c	All the gas lines must be made of SS316L BA, and only with orbital welding. Only VCR fittings to be used on process gas lines		
11	Vacuum Load lock :		
11.a	Vacuum Load lock with small volume < 30 liters.		
11.b	Inter chamber valve: VAT MonoVAT		
11.c	There must be suitable independent dry pump for the load –lock system		
11.d	Software controlled transfer on starting a process request from the control panel, the wafer should be automatically loaded for processing and returned to the load lock and left under vacuum until the user is ready to retrieve it. Then manually the load lock vented and lid opened for unloading the wafer.		
12	Chamber clean endpoint		
12.a	Endpoint software with matching view, tracer function and smith charts of reaction chambers for cleaning and monitoring		
13	Control system :		
13.a	The controller/software must include an automatic leak check.		
13.b	Main system controller essentials: • Programmable logic controller [PLC] • The software should include full data logging • The system should not have a limit to the number of process recipes it can store.		
13.c	System tolerances should be editable by the advanced user through the GUI.		
14	Power supply :		
14.a	240V + 10%, single phase, 50Hz or 415V, 3 phase, 50Hz.		
15	Product support :		
15.a	The vendor should give assurance for the availability of all the spares up to 10 years after the installation and commissioning of the system.		
16	Documentation:		
16.a	To be provided with the bid quotation: * ISO14001: 2015 quality certification * Installation documentation to be provided with the system: * Operation and maintenance Manuals on CD, and OEM manuals. Service Manual including OEM parts, circuit drawings should be given on clean room papers		
17	Warranty :		
17.a	Vendor to give one-year standard warranty for complete system		
18	Factory Test :		

18.a	Vendor to qualify Factory Acceptance Test (FAT) before delivery.		
19	Training:		
19.a	The vendor shall arrange factory training for two persons for 2–3 days, covering both processes and system configuration, along with fare, cost, and accommodation.		
20	Installation, commissioning at User site:		
20.a	The systems should be commissioned and demonstrated to meet up to two of the processes requested.		
20.b	Recipes to be provided for all requested process with starting points and trend information.		
21	Bidders :		
21.a	The bidder must confirm that the system manufacturer runs his own clean room with at least 1 system of the quoted type installed there.		
21.b	In total the supplier's own application lab must have minimum 15 systems and 20 process engineers and exist since minimum 10 years.		
21.c	Supply min 5 references of similar systems worldwide.		
21.d	Spare parts must be available for minimum 10 years from the parts' vendors.		
21.e	Supplier must confirm that he runs a free of charge service hotline since minimum 10 years.		
21.f	Add the telephone number and email and persons on the hotline.		
21.g	Telephone/web response time maximum 30 minutes.		
21.h	Service visit response by OEM engineer time maximum 2 working days		

Process Acceptance Criteria:

Batch 1: SiH4-SiN

Sample size	φ6" wafer
Gas to be used	SiH4, N2, NH3
Deposition thickness	500 nm
Deposition uniformity	≦± 2%
Refractive index uniformity	≦± 5%
Film stress	80-100 MPa
Plasma	80-100 W

Batch 2: SiH4-SiN

Sample size	φ6” wafer
Gas to be used	SiH4, N2, NH3
Deposition thickness	500 nm
Deposition uniformity	≦± 2%
Refractive index uniformity	≦± 5%
Film stress	-150 to 200 MPa
Plasma	200 W